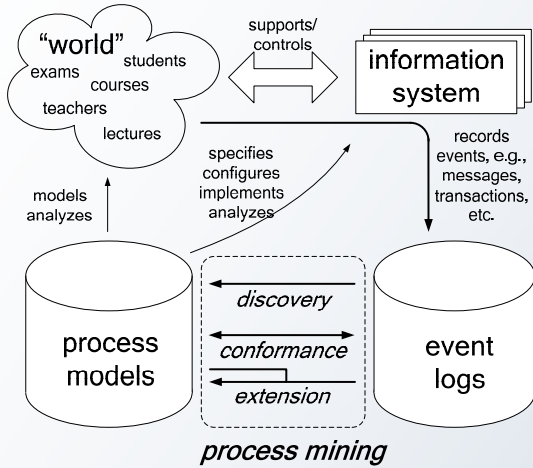


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**Process Mining** focuses on the development of a set of intelligent tools and techniques aimed at *extracting process-related knowledge from event logs* recorded by an information system.

- **conformance checking** - reflecting on the observed reality, i.e. checking whether the modeled behavior matches the observed behavior;
- **process model discovery** - constructing complete and compact process models able to reproduce the observed behavior,
- **process model extension** - projection of information extracted from the logs onto the model, to make the tacit knowledge explicit and facilitate better understanding of the process model.

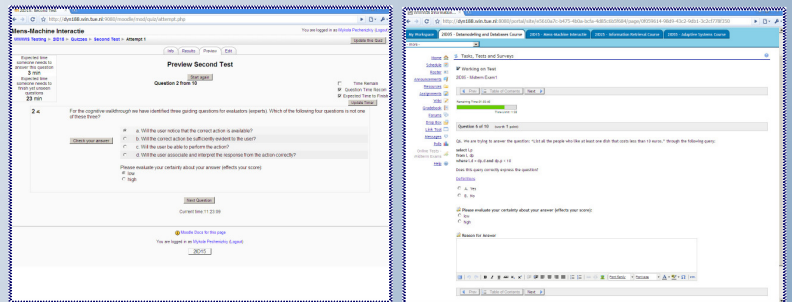
## Case Studies with ProM

### Online confidence-based assessment:

- a series of the multiple-choice question tests,
- with strict order vs. flexible navigation.

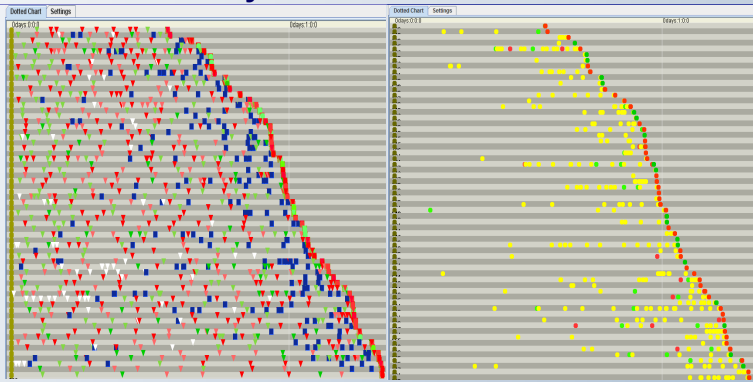
### Collected Data:

- correctness, certitude, time spent for answering;
- *strict-order navigation*: feedback requests, time spent for studying feedback;
- *flexible-order navigation test*: how many times a question/answer was skipped and/or revisited.



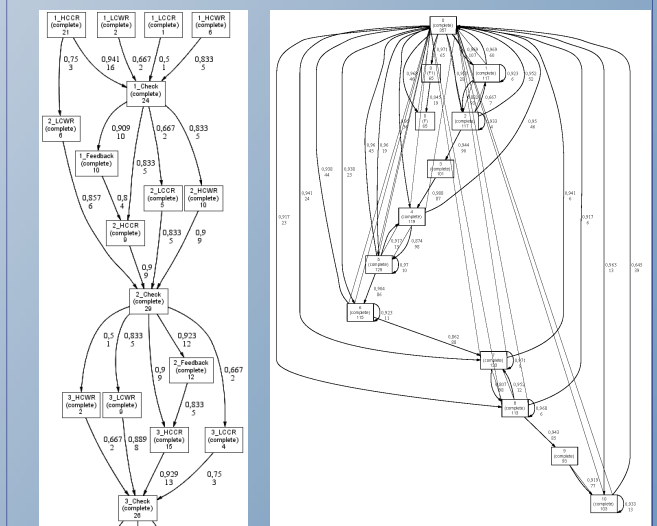
Snapshots of the tests with strict (left) and flexible (right) order navigation

## Dotted Chart Analysis



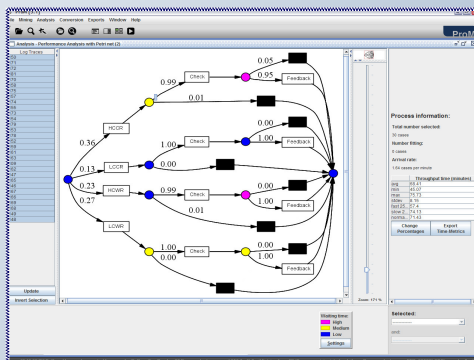
Case of flexible order navigation. Each dot corresponds to a certain event in the log. Left figure - all events, right figure - highlight of the revisions

## Process discovery with Heuristic nets

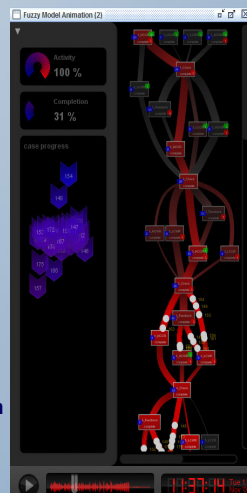


Heuristic nets of strict order (left) and of flexible order (right) tests

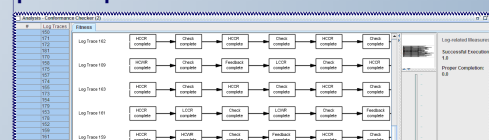
## Process analysis



Conformance checking of Petri net representing the question pattern of the test with strict order navigation



Fuzzy model animation of strict-order test



Conformance checking, log perspective



## Future work: development of

- *EduProM plugins* to bring process mining tools closer to the domain experts and better address some of the EDM specific challenges related to data (pre)processing and mining;
- *Authoring tools* pluggable to popular LMS and facilitating use of *EduProM*.